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A FOURTH SPECIES OF *TOXOPTERELLA* HILLE RIS LAMBERS (HOMOPTERA: APHIDIDAE) FROM NORTH AMERICA WITH A KEY TO SPECIES[1]

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Abstract.—Keys are given to the fundatrices and alate viviparae of the known species of *Toxopterella*. Alate viviparae and fundatrices of *Toxopterella* **stroyani**, n. sp. are described from *Crataegus* sp., Linville, and Blowing Rock, North Carolina.

The genus *Toxopterella* was described by Hille Ris Lambers (1960: 263) with *T. canadensis* Hille Ris Lambers from *Crataegus* as the type-species. MacGillivray and G. A. Bradley (1961: 1000) described *T.* (*Sorbobium*) *drepanosiphoides* as a new subgenus and species from *Sorbus*. Hille Ris Lambers (1962:147) described *T. smithi* from *Pyrus angustifoliae* and stated: "I believe *Sorbobium* can better be dropped as a subgenus of *Toxopterella*." However, Eastop and Hille Ris Lambers (1976: 432) and Smith and Parron (1978: 288) retained *Sorbobium* as a subgenus of *Toxopterella*. I believe this is justified because of the characteristics of the siphunculi (Fig. 4).

The pertinent characteristics of *Toxopterella* are: Dorsum in fundatrices and nymphal alatae extremely hairy, not sclerotic in apterae and not with a sclerotic patch on abdomen in alatae; alatae may have sclerotic bars on the abdomen; hind tibiae in larvae and adults with soundpegs as in *Toxoptera*; processus terminalis characteristically pointed with two setae at the tip and one seta at base of the two at the tip; secondary rhinaria conspicuously transversely oval; if three setae on the first tarsal joints are present, then the middle seta very much longer than the two lateral setae; siphunculi with a flange; cauda very short, may be somewhat triangular and/or pointed.

Hille Ris Lambers (1962: 147) stated: "The generic position of *Toxopterella* is rather clear. There is only a small number of Aphidine genera with

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a pointed processus terminalis and these genera are all associated with mosses."

H. L. G. Stroyan (personal communication) indicated that *Toxopterella* was very close to *Muscaphis*. I have seen two specimens determined as *Muscaphis musci* Borner, one specimen determined by Hille Ris Lambers and one specimen determined by Stroyan. I have also seen two specimens from the British Museum which were determined as *Muscaphis* sp. and appear to be the same as the other two specimens. In these specimens, the front of the head is flat and the siphunculi do not have a flange, whereas in the specimens of *T. stroyani*, n. sp., which resembles the four specimens mentioned above in most other respects, the front of the head has distinct antennal tubercles, and the flange on the siphunculi is quite distinct.

Transfer tests are needed between *Toxopterella* species and moss. This would be a difficult job because alates of *Toxopterella* are difficult to obtain, in fact the best way to obtain them is to find the stem mother and cage her in a cloth cage after all predators have been removed. Also, it would be necessary to transfer to several different species of moss.

The alate specimens of "*Muscaphis*" were captured by trapping, therefore, they are not necessarily associated with *M. musci*.

If specimens similar to the four specimens of "*Muscaphis*" listed above can be definitely associated with *Muscaphis*, it will be necessary to make *Toxopterella* a synonym of *Muscaphis* or at least a subgenus.

Toxopterella stroyani Smith, New Species
Fig. 1

Fundatrices (9 specimens).—Living specimens: Black with very many setae. Cleared specimens: Dark brown on head, all of antennae, appendages, including cauda and anal plate. Slightly paler on basal ⅔ of profemora and slightly lighter in central to distal ½ of the tibiae. Distal end of tibiae darker but not as dark as the basal ⅔.

Measurements (in millimeters) (1 specimen): Body 2.45, antennal segment III 0.46, IV 0.22, V 0.13 + 0.20, rostral IV + V 0.14, hind tibia 1.10, metatarsomere II 0.11, siphunculi 0.45, cauda 0.10 and bearing 4 setae. Tarsal chaetotaxy 2-2-2, setae on antennal segment III 2.5 times base of antennal segment III, setae on dorsum of abdomen long, numerous, usually curved, 0.05 to 0.06, similar to setae on antennal segment III. Head and abdomen very rough or rugose with wartlike projections. Left hind tibia with about 12 soundpegs.

Fundatrices distinguished from other species of *Toxopterella* by characters given in key.

Alate viviparae (111 specimens).—Color of living material, nymphs (37 specimens), and alate, dark reddish. Cleared specimens dark on head, thorax, all of antennae, siphunculi, cauda, and anal plate. Legs dusky, being

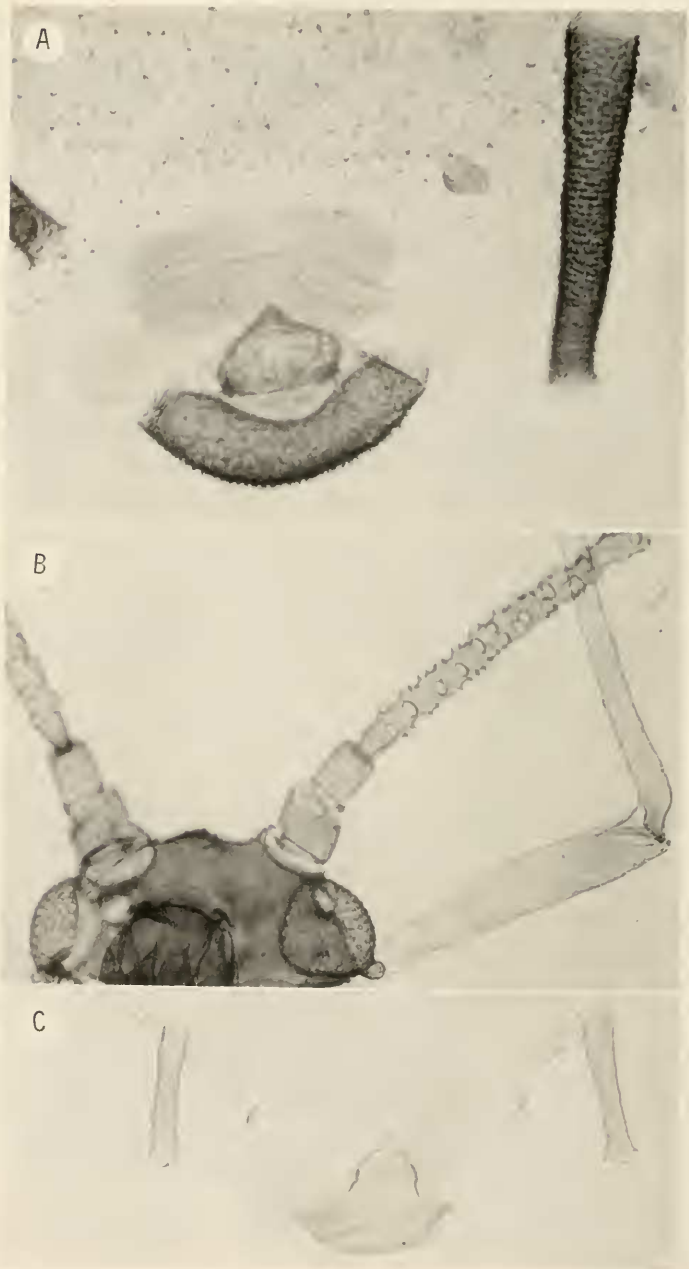

Fig. 1. *Toxopterella stroyani*. A, Fundatrix, siphunculus and cauda. B, Alate vivipara, head and antennal segments I–III. C, Alate vivipara, siphunculi and cauda. (Photographs in Figs. 1–4 are of the same magnification.)

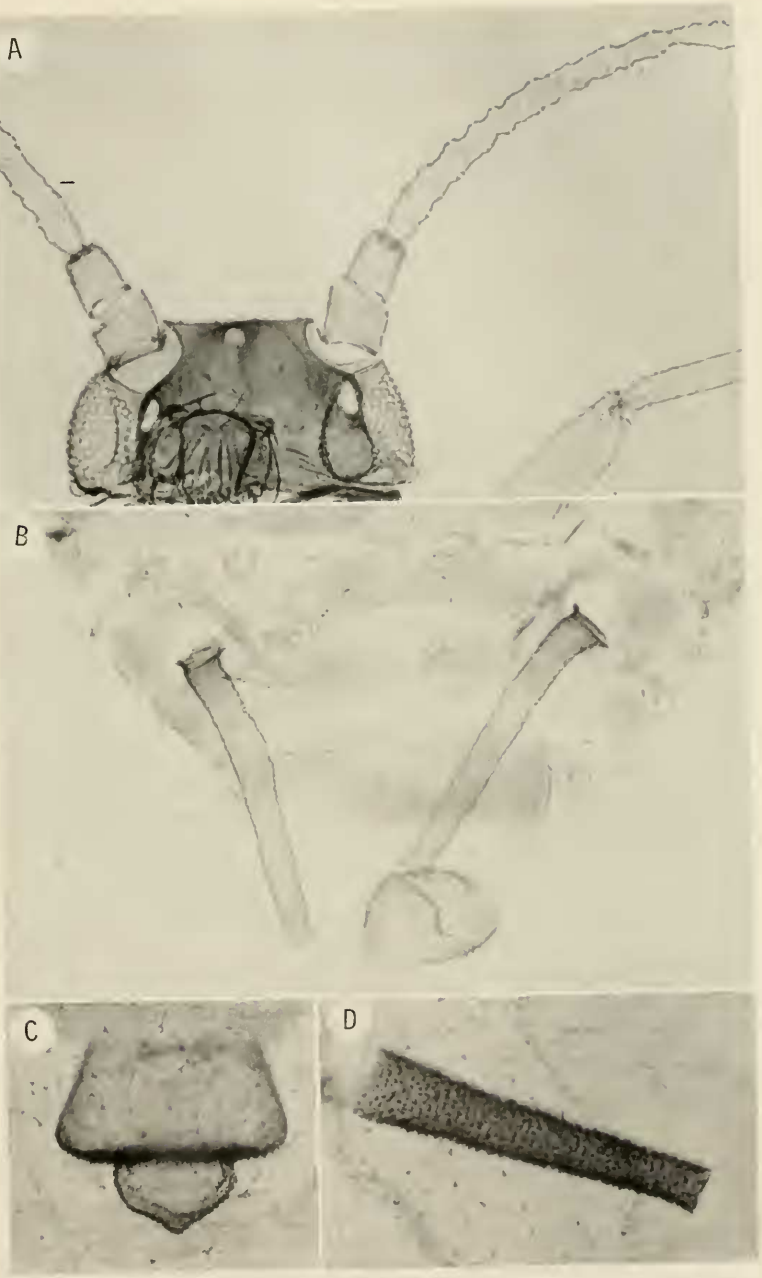

Fig. 2. *Toxopterella smithi*. A, Alate vivipara, head and antennal segments I–III. B, Alate vivipara, siphunculi and cauda. C, Fundatrix, cauda. D, Fundatrix, siphunculus.

slightly lighter on middle of tibia and basal portion of femora. Dark on wing veins with a slight halo. Abdomen occasionally with faint scleroites around base of a few setae. In general, abdomen pale with scleroites only on lateral margins.

Measurements: Length of body (first measurement is that of holotype; measurements in parentheses are range for 6 specimens): 1.73 (1.60–1.95), width of head 0.42 (0.39–0.42), antennal segment III 0.38 (0.38–0.50), IV 0.27 (0.26–0.30), V 0.31 (0.26–0.31), VI 0.18 (0.14–0.18) + 0.81 (0.54–0.81), rostral IV + V 0.12 (0.112–0.12), hind tibia 1.20 (1.11–1.24), hind tarsus 0.07 (0.07–0.09), siphunculus 0.16 (0.15–0.20), cauda 0.08 (0.07–0.09), antennae with large tuberculate, oval to oblong rhinaria on antennal segment III, 36 (38–50), IV 27 (26–30), V 20 (26–31). Primary rhinarium on antennal segment V similar to secondary rhinaria, may be larger. Primary rhinarium on antennal segment VI, oval. R IV + V with 4–5 accessory setae, cauda with 4–5 setae. Tarsal chaetotaxy 3-3-3, with 1 large stout seta and 2 shorter ones laterad. In some specimens the large stout seta missing.

Alate viviparae separated from other known species of *Toxopterella* by characters given in key.

Type-locality.—Linville and Blowing Rock, North Carolina.

Types.—Holotype from collection no. 66-242, 1 alate specimen, labeled no. 1 on a slide from collection no. 66-242, Linville, North Carolina, July 2, 1962 on *Crataegus,* collector C. F. Smith. The holotype with paratypes from the same collection and collection no. 79-6, Blowing Rock, North Carolina, June 20, 1979, in U.S. National Museum of Natural History. Paratypes in the collections of the U.S. National Museum of Natural History; Canadian National Collection, Ottawa; British Museum (Natural History); North Carolina State University; H. L. G. Stroyan; and the author.

Collections.—On *Crataegus* sp., Linville, North Carolina, June 1, 1966 (coll. 66-157) by H. L. G. Stroyan and Clyde F. Smith. Alate viviparae from same tree as collection 66-157. Collection no. 66-242, Linville, North Carolina, July 2, 1966 by Clyde F. Smith. Collection no. 79-6, on *Crataegus punctata* Jacquin (determined by J. W. Hardin), Blowing Rock, North Carolina, June 20, 1979 by Crystle K. Smith and Clyde F. Smith.

Etymology.—Named in honor of H. L. G. Stroyan who assisted in making the first collection of this species and suspected it was new to science.

Key to Species of *Toxopterella*

Alatae

1. Siphunculi nearly parallel sided, imbricated 2
– Siphunculi with basal half distinctly swollen, diameter nearly 2 times the smallest diameter of the distal half. Imbricated on distal half and on caudal half of base, ventral surface of base smooth

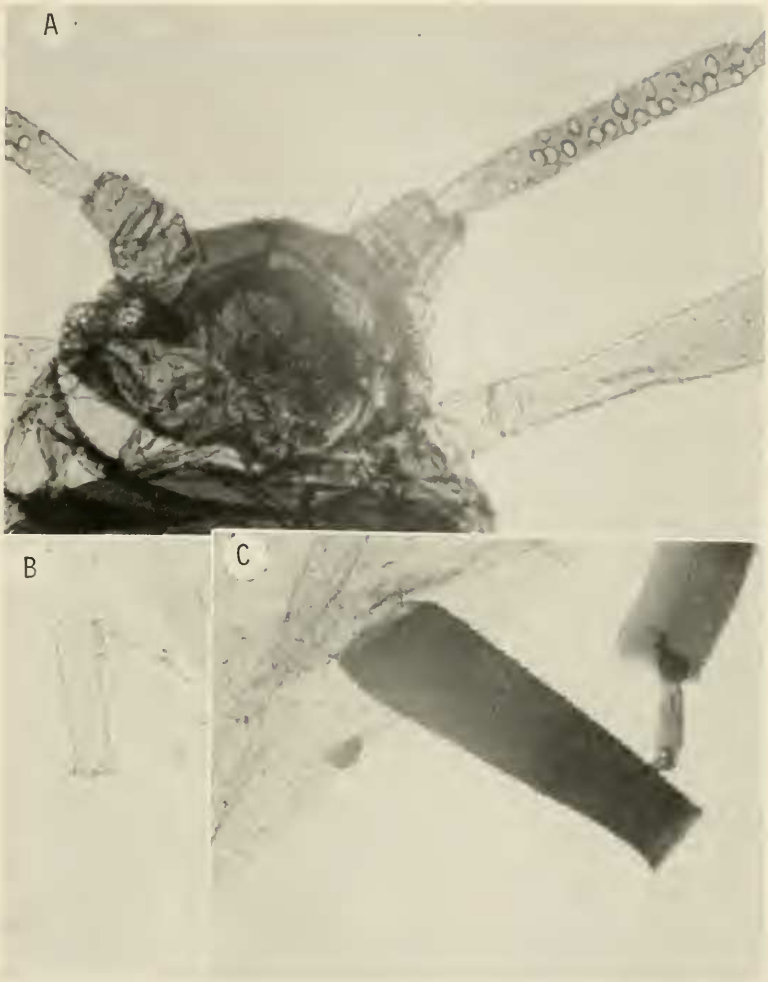

Fig. 3. *Toxopterella canadensis*. A, Alate vivipara, head and antennal segments I–III. B, Alate vivipara, siphunculus. C, Fundatrix, siphunculus.

(Fig. 4); on *Sorbus* .....
..... *T.* (*Sorbobium*) *drepanosiphoides* MacGillivray and Bradley

2(1). Siphunculi about 0.17 mm long, with denticulate imbrications on entire length; on *Crataegus* spp. 3

– Siphunculi about 0.35 mm long, with denticulate imbrications only on distal end (Fig. 2); on *Pyrus angustifolia* .....
..... *T. smithi* Hille Ris Lambers

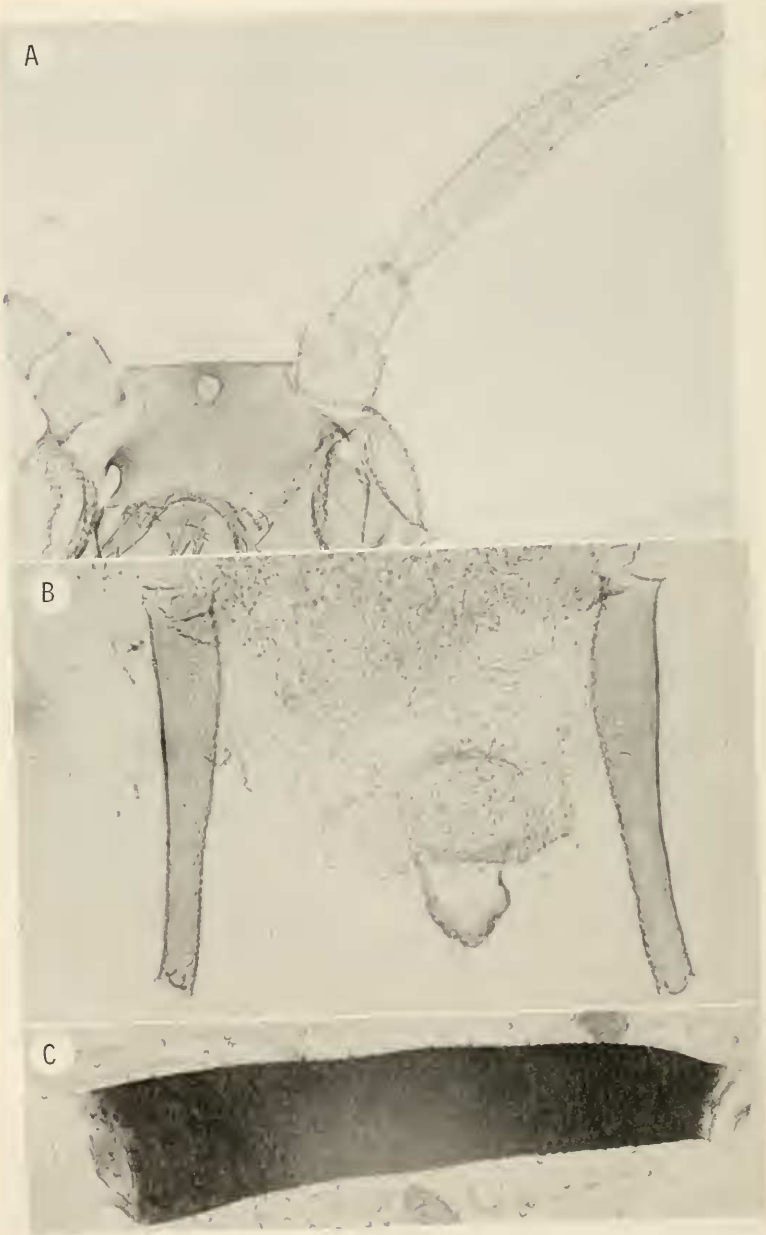

Fig. 4. *Toxopterella* (*Sorbobium*) *drepanosiphoides*. A, Alate vivipara, head and antennal segments I–III. B, Alate vivipara, siphunculi and cauda. C, Fundatrix, siphunculus.

3(2). Primary rhinaria on antennal segment V about as wide as long, distinctly larger than secondary rhinaria. Protarsomere I with 2 very short setae. Abdomen with dark intersegmental sclerites with a tendency to transverse bars on abdominal tergites V–VIII (Fig. 3) ..... *T. canadensis* Hille Ris Lambers

– Primary rhinaria on antennal segment V usually not as wide as long, often difficult to distinguish from secondary rhinaria (a variable character). Protarsomere I usually with 2 short setae laterad of the 1 long seta. Abdomen without dark intersegmental sclerites and transverse bars on abdominal tergites V–VII. Siphunculi relatively thin and delicate compared with *canadensis* (see Figs. 1 and 3) ..... *T. stroyani*, new species

Fundatrices

1. Siphunculi more than 0.5 mm long, usually 0.6–0.7 mm. Antennae pale on segments III and IV 2

– Siphunculi less than 0.5 mm long, usually about 0.4 mm. Antennae dark on segments III and IV 3

2(1). Setae on dorsum of abdomen about same density as on sides of abdomen .....
..... *T.* (*Sorbobium*) *drepanosiphoides* MacGillivray and Bradley

– Setae on dorsum of abdomen much more sparse than on sides of abdomen ..... *T. smithi* Hille Ris Lambers

3(1). Front of head nearly straight, antennal tubercles absent or developed very slightly ..... *T. canadensis* Hille Ris Lambers

– Front of head with antennal tubercles well developed .....
..... *T. stroyani*, new species

Acknowledgments

I greatly appreciate the opinions expressed by D. Hille Ris Lambers, H. L. G. Stroyan, and Victor Eastop concerning specimens of *Toxopterella* and *Muscaphis* which they examined. I also appreciate specimens of *Toxopterella* from W. R. Richards, Canadian National Collection, Ottawa, and D. Hille Ris Lambers.

Literature Cited

Eastop, V. F. and D. Hille Ris Lambers. 1976. Survey of the World's Aphids. Dr. W. Junk b.v., The Hague. 573 pp.

Hille Ris Lambers, D. 1960. Some new genera and species of aphids from Canada (Homoptera: Aphididae). Can. Entomol. 92: 251–65.

———. 1962. A third species of *Toxopterella* Hille Ris Lambers (Homoptera: Aphididae) from North America. Fla. Entomol. 45: 143–8.

MacGillivray, M. E. and G. A. Bradley. 1961. A new subgenus and species of *Toxopterella* Hille Ris Lambers (Homoptera: Aphididae), from *Sorbus*. Can. Entomol. 93: 999–1005.

Smith, C. F. and C. S. Parron. 1978. An annotated list of Aphididae (Homoptera) of North America. N. C. Agric. Exp. Stn. Tech. Bull. No. 255: 1–428.